Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A real-time biofilm monitoring system comprising:

~~a~~ at least one ~~single~~ fiber-optic probe that detects ~~wavelength-specific~~ fluorescence ~~from~~ of an inherent biomarker of a fouling ~~organisms~~ organism~~,~~; and

a compact optoelectronic interface and data acquisition system interfaced with said probe, wherein said probe is bifurcated and contains at least one excitation and at least one emission filter ~~permitting the simultaneous~~ capable of resolution of multiple emission wavelengths that can be correlated to the presence or absence of an inherent biomarker ~~biomarkers~~.

2. (Currently amended) ~~A~~ The real-time biofilm monitoring system of claim 1, comprising~~:~~ multiple fiber-optic probes ~~detecting wavelength-specific fluorescence from biomarkers of fouling organisms;~~

~~a compact optoelectronic interface and data acquisition system interfaced with said probes, wherein said probes are bifurcated and contain at least one excitation and at least one emission filter permitting the simultaneous resolution of multiple biomarkers~~.

3. (Cancelled)

4. (Currently amended) A method for detecting a fouling ~~organisms~~ organism comprising detecting fluorescence of an inherent biomarker comprising:

a. introducing excitation light into a first side of a bifurcated optical fiber bundle directed at a sample;

b. obtaining an emission arising from ~~the~~ a substrate through a second side of a bifurcated optical fiber bundle; and

c. detecting the emission ~~arising~~ from the substrate and correlating ~~this~~ the emission to the presence or absence of a fouling ~~organisms~~ organism.

5. (Currently amended) The real-time biofilm monitoring system according to claim 1, further ~~including~~ comprising an excitation reference channel to correct for spectral interference from non-biological materials.

6. (Currently amended) The real-time biofilm monitoring system according to claim 2, further ~~including~~ comprising an excitation reference channel to correct for spectral interference from non-biological materials.

7. (Cancelled)

8. (Currently amended) The method according to claim 4, wherein the fouling organism is *P. Aeruginosa*.

9. (Currently amended) The method according to claim 4, wherein the sample is selected from the group consisting of a process fluid ~~fluids~~, a heat exchange systems, a utility plant ~~plants~~, a microelectronics fabrication system ~~systems~~, a food processing systems, a fluid handling system, and pulp and paper processing system ~~systems~~.

10. (Currently amended) The method according to claim 4, wherein the sample ~~is~~ comprises a substrate selected from the group consisting of glass, polycarbonate, metal, and paint.

11. (Currently amended) A method for detecting a plurality of fouling organisms comprising detecting fluorescence of an inherent biomarker comprising:

a. introducing excitation light into a plurality of first sides of a plurality of bifurcated optical fiber ~~fibers~~ bundles directed at a sample, wherein the excitation light can be the same or different for each first side of the bifurcated optical fiber bundles;

b. obtaining emissions arising from ~~the~~ a substrate through second sides of a plurality of bifurcated optical fiber ~~fibers~~ bundles; and

c. detecting the emission ~~arising~~ from the substrate and correlating this emission to the presence or absence of fouling organisms.

12. (Currently amended) The method according to claim ~~8~~ 11, wherein the sample is selected from the group consisting of a process fluid ~~fluids~~, a heat exchange system ~~systems~~, a utility plant ~~plants~~, a microelectronics fabrication systems, a food processing system ~~systems~~, a fluid handling system, and pulp and paper processing system ~~systems~~.

13. (Currently amended) The method according to claim 8, wherein the sample ~~is~~ comprises a substrate selected from the group consisting of glass, polycarbonate, metal, and paint.

14. (New) The real-time biofilm monitoring system of claim 1, wherein the system detects fluorescence *in situ*, in-line, or external to a sample.

15. (New) The real-time biofilm monitoring system of claim 1, wherein the system does not include additional reagents or consumables.

16. (New) The real-time biofilm monitoring system of claim 1, wherein the biomarker is selected from the group consisting of an amino acid, ATP, NADH, chlorophyll, and bioluminescence.

17. (New) The real-time biofilm monitoring system of claim 16, wherein the amino acid is selected from the group consisting of Trp, Tyr, and Phe.

18. (New) The real-time biofilm monitoring system of claim 16, further comprising detecting % transmission of excitation light.

19. (New) The real-time biofilm monitoring system of claim 17, wherein a change in the % transmission of excitation light can be correlated to scaling due to non-biological materials selected from the group consisting of $CaCO_3$ and $MgSO_4$.

20. (New) The real-time biofilm monitoring system of claim 1, wherein the system is capable of simultaneous resolution of multiple inherent biomarkers.

21. (New) The real-time biofilm monitoring system of claim 1, wherein the system detects fluorescence of at least one inherent biomarker using multiple excitation wavelengths or multiple emission wavelengths.

22. (New) The real-time biofilm monitoring system of claim 1, wherein the probe performs direct fluorescence detection of a inherent biomarker.

23. (New) The real-time biofilm monitoring system of claim 1, wherein the system measures sloughing of a biofilm from a substrate.

24. (New) The method of claim 4, wherein the emission from a bulk phase bacteria is distinguishable from emission from the biofilm.

25. (New) The method of claim 4, wherein the method is performed *in situ*, in-line, or external to a sample.

26. (New) The method of claim 4, wherein the biomarker is selected from the group consisting of an amino acid, ATP, NADH, chlorophyll, and bioluminescence.

27. (New) The method of claim 26, wherein the amino acid is selected from the group consisting of Trp, Tyr, and Phe.

28. (New) The method of claim 4, further comprising detecting % transmission of excitation light.

29. (New) The method of claim 4, wherein the system is capable of simultaneous resolution of multiple inherent biomarkers.]

30. (New) The method of claim 4, wherein multiple excitation wavelengths are introduced or multiple emission wavelengths are detected.

31. (New) The method of claim 4, wherein the method comprises direct fluorescence detection of a inherent biomarker.

32. (New) The method of claim 4, further comprising distinguishing a bulk phase bacteria from the biofilm.